# AMRAD NEWSLETTER

Amateur Radio Research and Development Corporation April 1983

**April 4 Meeting**

Terry Fox, WB4JFI and Paul Rinaldo, W4RI will discuss developments at the Second ARRL Amateur Radio Computer Networking Conference in San Francisco on March 19. The meeting is at 7:30-9:00 P.M. at the Patrick Henry Library, 101 Maple Ave. E (VA Rte 123), Vienna, VA.

**May 16 Meeting**

Hal Feinstein, WB3KDU will give a talk on local-area networks.

**Dayton Hamvention Packet Gatherings**

There will be a packet radio forum in one of the meeting rooms. Check the program booklet for room and time.

AMRAD, SLAPR, and TAPR will share a packet radio booth. Please drop by and plan to take your turn at manning the booth.

On Saturday evening at 7:00 P.M. a dinner for packeteers will be held at the Upper Crust, 1919 N. Main (OH. Rte 48). Parking in the rear. The arrangements for this were made by Bob Neben, K9BL.

Packeteers operating on two meters at the hamfest should look for AMRAD on 144.48 MHz simplex (the traditional AMRAD hamfest frequency).

There will be a dirty-old-man's dinner meeting Saturday night after the packet dinner. Anyone interested will be able to attend both, but you must eat dinner at both! Contact Tom, W3IWI at the AMSAT booth for more information.

**Foundation for Amateur Radio**

The Foundation plans to award ten schoralships for the academic year 1983-1984. Licensed Radio Amateurs may compete for these awards (varying from approximately $300 to $900) if they are planning to be full-time students in an accredited university, college, or technical school. For more information contact:

Hugh Turnbull, W3ABC
6903 Rhode Island Ave.
College Park, MD 20740

**AMTOR Software Needed**

Earle Adams, K2YEF is looking for a SITOR/AMTOR receive-only program for the Apple II Plus computer. Write: 718 Graisburg Ave, Haddonfield, NJ 08033.

**Packets Flying in Washington**

On March 6, the AMRAD repeater sounded like a network node for Telenet! There were over ten different packet stations going at it. There was a mixture of TAPR and Vancouver boards packeting back and forth between themselves, but not with the other type of board. There is a slight anomaly that prevents the two types of TNCs from connecting to each other at the present time which Dave and Lyle discuss in their columns in this issue.

It sounded to the casual listener like we had reached the saturation point of pure ALOHA!

**Preframe Sync Update**

After some delicate prodding of bits, it appears that the Zilog 8530 SCC is capable of producing preframe sync (bit-reversal as opposed to flag fill). This means both the Intel 8273 and the Zilog 8530 are definitely capable of this mode, with the jury still out on the Western Digital 1933. Anyone with information on how to coax the 1933 to produce continuous bit reversals should pass the information along to AMRAD.

**Attention Deaf Radio Amateurs**

Regular AMRAD Newsletter columnist Barry Strassler, KA3KDF is interested in getting in contact with all deaf and hearing-impaired amateurs. Barry has received a number of letters from deaf and hearing-impaired hams, including a long one from Bob Weinstock, KN1K. AMRAD plans to run include some of this correspondence in the June issue. Barry has raised the question of the desirability of forming some type of deaf ham group. Please drop Barry a note and let him know your ideas. Contact Barry at:

Telecommunications for the Deaf, Inc.
814 Thayer Avenue
Silver Spring, MD 20910
301-589-3006 (voice/TTY)

**Teleconference Radio Net**

The March 3 Teleconference Radio Net featured Vic Clark, W4KFC, president of the ARRL. Vic gave his views on the future of Amateur Radio, and accepted questions from the listening audience, which included 65 repeaters throughout North America. Most of the questions and comments concerned the FCC's code-free license proposal.

The next Teleconference will be held on June 2 at 8:30 P.M. Eastern time, and will be heard on the AMRAD repeater. Joe Reisert, W1JR will be discussing state-of-the-art antennas and antenna design.

**New AMRAD Newsletter Editor**

Since Paul, W4RI has been recruited by the ARRL as the new Manager, Technical Dept., Terry, WB4JFI has taken over as editor of the newsletter. All material for the newsletter should be sent to our new address, attention Editor, AMRAD Newsletter. Material for the newsletter should be sent by the eigth of the preceeding month to our new address, which is as follows:

Amateur Radio Research and Development Corp.
PO Drawer 6128
McLean, VA 22106

Please discontinue sending ANY correspondence to the old address (1524 Sprinvale Ave, McLean VA 22101).

## Rinaldo's Laws

Paul L. Rinaldo, W4RI
1524 Springvale Avenue
McLean, Virginia 22101

As I will be leaving the Washington area in early May, I thought it appropriate to share the wisdom that I have accumulated thus far. These truths have come not as a vision but by observation over time. Accordingly, I have synthesized the following laws:

**First Law. Choreography is its own reward.**

Some things are done only for the sake of form. Don't fight it by looking for substance in everything. Do it long enough and you'll find enjoyment in an elephant dance.

**Second Law. He who does the work shapes it.**

As applied to computers, he who writes the code rules (the Codin' Rule).

In meetings, he who writes the minutes determines the outcome.

**Third Law. The less the knowledge, the more jealously it is preserved.**

Societies with only a few precious facts make their people memorize them and pledge to faithfully abide by them.

In contrast, highly developed disciplines quit worrying about losing knowledge (unless that computer crashes and there is no backup).

**Fourth Law. Excellence increases demands.**

Critics gather to spot tinier flaws as work nears perfection.

Promptness invites impatience. In correspondence, the faster you answer a letter, the faster your correspondent will answer giving you something with a shorter deadline. This reaches a fever pitch with electronic mail.

**Fifth Law. Skills diminish professionalism.**

Engineers who admit to drafting skills are vulnerable to assignment of drafting work, just to help out.

Similarly, female professionals should hide any clerical skills lest they be asked to pinch hit for one of the secretaries in the event of illness.

**Sixth Law. What separates the competent from the incompetent is the ability to cover up mistakes.**

Many successful sales demonstrations have been made with defective products in the hands of competent persons who avoid demonstrating the features which don't work. Beautiful Xerox copies can be made from originals riddled with correction fluid. Recovery from some grievous errors can be attained by simply announcing, "No problem. We'll just put it back in the word processor!" The computer software profession seems to be the exception; who else is so blatant as to have a term such as "debugging" to let the world know that they need extra time funded by the customer to correct their own errors.

**Seventh Law. Silence is not acquiescence.**

Contrary to what you may have heard, silence of those present is not necessarily consent, even the reluctant variety. They simply may sit in stunned silence and figure ways of sabotaging the plan after they regain their composure.

**Eigth Law. Quick-reaction and slow-reaction facilites rotate.**

Once people discover that there is a quick-reaction facility (QRF), they will try to get all their work done there, bogging it down in work and leaving the slow-reaction facility (SRF) nothing to do, thus becoming the faster of the two.

**Ninth Law. Complexity attracts brilliance.**

The KISS (keep it simple, stupid) principle is no fun and certainly not a professional approach. If you want brilliant people to do work for you make it complex and demanding.

The true professional will spend 20 hours at the computer writing a one-time-use program that will replace 10 hours of clerical work. Anyway, 20 hours at professional rates pays more than 10 hours at clerical rates. Also, it's more intellectually rewarding. The greatest achievement is to use one's finest professional talents to accomplish something that didn't need to be done.

**Tenth Law. Bad guys are replaced.**

Did you ever rejoice over the departure of someone you couldn't get along with only to find that a replica has shown up?

When you are trying to make a U-turn and you have someone tailgating you, have you pulled off on a sidestreet, then into an alley only to find that two other cars are right behind you?

## Valley Q Signals

These Q signals were recently adopted by the National Q Signal Society for use on valley repeaters.

| | |
|---|---|
| QNA | Lets sit in a circle and hold hands. |
| QNB | You tell me? I tell him? I mean really! |
| QND | Like, I'm honcho of this dimension. |
| QNE | Hang in there. |
| QNF | Nerds, freakes, go at it. |
| QNG | See if you can control this mob. |
| QNH | Man, you're high. |
| QNI | Like, am I all alone in this world? |
| QNJ | Is anything getting through to you? |
| QNL | A new low. Like, gross. |
| QNM | Bag your face. You're in our space. |
| QNN | Who's numero uno on this wavelength? |
| QNO | Slipping away from this dimension. |
| QNP | Not perfect. |
| QNT | Not tubular. |
| QNV | You two want to hold hands? |
| QNY | Find some other turf. |
| QNZ | Not zero. Get it on. |
| QRA | Really awesome. |
| QRB | You're, like, all the way. |
| QRG | Really grody. To the max! |
| QRJ | Rad juice. Your signal's been nuked. |
| QRK | Relax. You're cool. Really wrapped. |
| QRL | Really, like, you know, totally involved. |
| QRM | Ultimate slime. |
| QRN | Really nauseating. |
| QRO | Crank it to the max. |
| QRP | No biggie. |
| QRQ | Full tilt boogie. |
| QRT | Total, terminal rejection. |
| QRU | Ruined. A tubular farewell to reality. |
| QRV | Quivering RV. |
| QRX | Like, take off! |
| QRY | It's ours to share. |
| QRZ | Like, they're pulling your chain. |
| QSA | Sher is awesome. |
| QSB | Like your signal is blitzed. |
| QSG | Gag me with a spoon. Win big prizes. |
| QSK | Like, I hear you in there! |
| QSL | Fer sher! Like, I don't give receipts. |
| QSO | Full sesh, like, you know, involved. |
| QSY | Sleeze and yuck. Find another dimension. |
| QTA | Totally awesome. Like, totally! |
| QTB | Total bummer. |
| QTC | Totally cranking. |
| QTH | Tubular hacienda. |
| QTV | Terminal video game victim. |

# Totally Awesome Protocol

Tiffany Total
123 Valley Way
Awesome City, CA 99999

We in the valley have been like, reading about this "packet radio" stuff for a while, and it sounded really rad to the max, but like we couldn't understand it so we like took some of the notes we found about it to our local English-to-Valspeak interpreter so we could like, indentify with it. Well, gag me with a spoon!! Was the result ever GRODY TO THE MAX!!! So we, like wrote our own protocol(?) that is really bitchin, and thought like we'd share it with you crispy dudes.

## Valley-Gram Building

A bunch of us got together at the shopping center a coupla weeks ago, and like we figured out that you space cadets had some real rad ideas, but your words were, like totally gross!! We came up with this totally crankin' way of doing the same thing, only not the same way.

Like, we started with the name. A frame is what you geeks put around a picture, and a packet is what controlled substances come in....oh well, like you know. We had to come up with a name that we could like, identify with. Enter the Valley-Gram (VG). It like, says it all. The Valley-Gram is, like a letter to some dude. It is different, depending on if the dude is like, way gnarly or a crispy hosehead. The Valley-Gram is made up of smaller parts, called Spaces. To us in The Valley, a field is where we grow certain plants.

### Like Space

Each Valley-Gram starts with a Like. A Like is like, well like Like. It is used to show that a Val is ready to like, communicate. A Like is used at the start and end of each Valley-Gram. Like is like what you Poindexters call a flag. In The Valley, a flag is the little sticker on the back window of our Rabbits, or what we used to salute at school in the mornings.

### Address Space

The next space used in a Valley-Gram holds the address of the Valley-Gram. We decided to like follow you Jel-heads by including the names of both the receiver and the sender. If I am sending a VG to my dude, the address space would like have in it Tiffany,Tommie. This shows that this VG is like from me (Tiffany) to like my totally trick dude (Tommie). Anyone receiving a Valley-Gram for someone else should like ignore it, otherwise the sender may get totally edged, fer shurr!

### Type Space

The type space is used to like show what type of VG this is. That way the receiver can ignore a VG if it is, like bad news or something. If it's hi-pri news (like a half-price sale at the shopping center), the message can get through before less important stuff like going to the dermatologist. The following values are like available as types of Valley-Grams:

0. Grody to the Max (GM type of VG).
1. Bag It (BI type of VG).
2. Totally Bogus (TB type of VG).
3. Like Beige (LB type of VG).
4. Far Out (FO type).
5. TRick (TR type).
6. Totally Awesome (TA type).
7. Rad to the Max (RM type).

In addition to the above mentioned type spaces, the following are like responses telling the addressee if you like received the VG ok, and what you thought of it. They are:

0. Totally Hosed (TH type response).
1. Gag me with a Spoon (GS type response).
2. Bottom Line (BL type response).
3. Bummed Out (BO type response).
4. Go fer IT (GI type response).
5. Hairy fer Shurr (HS type response).
6. Bitchen Twitchen (BT type response).
7. Fer Shurr!!! (FS type response).

### Val Identification Space

The next space is taken up by the Val Identification. The Val Identification Space (VIS) like holds a secret number that identifies if you are a totally rad Val, an honorary Val, or a totally bagged hosehead trying to like sneak into our scene. If the VIS is like, wrong, then all true Vals must continually send the TH response until the geek freak goes. TOTALLY!

The VIS is like Totally Top Secret, and can't be given out under penalty of being outcast from The Valley to Geeksville. It is rumored that the VIS contains Tom Sellecks phone number, but we like can't say. If you are a true Val, you already know it, an honorary Val is given it, and all other nerds don't need to know.

### Letter Space

The next space in a Valley-Gram is used to say anything a Val wishes. It can be up to fifty words long. Any longer and a typical Val may, like lose his or her cool! Remember that the letter space is totally available to the Val, like TOTALLY!!

### Credit Card Number

Following the letter space comes the most important part of a Valley-Gram. Each VG must have a credit card number attached to it. This comes in handy like when you have to send a VG across the valley to order some new shoes during the big Shoe-A-Rama sale. It also comes in handy whenever you forget your credit card. You can like send a Valley-Gram to yourself and get the number!! Neat? Fer Shurr!!

At the end of the credit card space comes another Like to like end the Valley-Gram like.

## Using Valley-Grams

Valley-Grams are like used between valley people (called Vals) to like chat. In order to chat, one Val must first tell the other that, like they want to rap.

### Valley Connections

A Valley connection is established by like sending several TA type Valley-Grams to get the attention of the other Val. If the other Val wants to chat, they should respond with a GI type VG. The two can then have a totally full-sesh!

If the other Val doesn't want to talk, they may send back one of the following, depending what they like feel like:

TH response indicates that the Val thinks you are some kind of hosed nerd.

A GS response means you like just stole my cool dude, and I am like totally edged at you.

A BO response tells you that I am like totally bummed out about something, and don't want to like chat now.

### Normal Chatting

Once a full-sesh begins, like anything can be sent back and forth, except for a BI type Valley-Gram. Any time a Val receives a BI type VG, they should assume that the other Val is done, and has to go shopping. The proper VG response after receiving a BI is to send a BL response VG. Both Vals are then like able to chat with other Vals if they want.

### Jel-Dude Interference

As pointed out earlier, any time a geek or other type of Jel-Dude shows up on a Val channel, the Vals should send TH responses until the Jell-O brain moves on. If the interference like

(continued on next page)

continues, a more drastic approach may become necessary. Like some real large gnarly Val dudes may be recruited to like realign the geek's head.

**Totally Tubular Data Encoding**

The way Valley-Grams are encoded must make sure that a Like like doesn't show up anywhere other than at the beginning and end of Valley-Grams. Because of this, like all data between the opening and closing Likes must be Totally Random Bit Inverted with a half-bit shift (TRBIHBS). This TRBIHBS is taken care of in the hardware described next, using a standard Signetics part.

**Valley Node Controller**

In order to use the Totally Awesome Protocol (TAP), a Val must have the official hardware. The hardware is like called a Valley Node Controller, or VNC. This VNC uses an Ohio Scientific Inc. (OSI) type of computer with an additional like logic board. Unlike you crispy dudes, we Vals have advanced to a totally new way of communicating. We use like new-wave (totally different head altogether, totally) communication. A patent has like been applied for so I can't give out the full details, but like the general idea follows.

The OSI computer feeds the Valley-Gram data to the extra board. The extra board (called a Val-Speak Node Board, or VSNB) has on it a Signetics 25120 WOM, a modem, and two new-wave devices. These new-wave devices are called the Darkness-Emitting Diode (or DED), and the Reverse-Biased Photo Transistor (or RBPT).

The 25120 is not a new device (it was announced several years ago) but it is like almost never used. It is a 9046-by-N Write-Only Memory packed in several types of cases. The 25120 on the VSNB is a 11.5-bit, 36-pin device with the drain on the back. It is responsible for doing the TRBIHBS encoding and like storing the Valley-Gram for sending over the new-wave link (NWL).

Data is sent and received over the NWL with the DED and RBPT. The DED uses a like secret process that inverts light into darkness and then like adds the Valley-Gram data into the darkness. This can keep the Val totally in the dark, totally. The RBPT is used at the receiver to like reverse the darkness process and recover the Valley-Gram data as sent.

Well, that's about it for now. Our first and most important project is to like hook up all shopping centers around the country so us Vals can check out sales anywhere in the country. We will like send you Poindexters more information (but not too much) as the Val-Net progresses.

**End of Valley-Gram**

Ed. Note:
This information was found on my terminal late one night, thought I'd pass it along. Terry

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# A BACKBONE REPEATER LINK SYSTEM FOR FULL DUPLEX 300 BAUD DATA

LCDR R. E. Bruninga
USS Blue Ridge (LCC-19)
FPO San Francisco, Ca. 96628

The idea that follows is the result of months of idle pencil scratching and one brief flash of logic inspired by yesterdays visit to the local junkyard in Aki-Habara in Tokyo. In one of the alley stalls a fellow was offering nice little 450 Mhz single frequency rigs that had been removed from the local train system. I have often doodled with the idea of building various data links among repeaters to enhance our data coverage; but the schemes always seemed to be full of compromises, or require a full receiver/transmitter/cavity system for each direction at each link point.

The flash of inspiration occurred while trying to figure out an application for the fact that the Bell 103 Originate/Answer system is capable of sending two independent 300 baud data channels in the same 3 Khz audio bandwidth. First consider the typical operation of the two meter repeater transmitting to its normal area of coverage using the 2225 Hz tone pair as was done during early ASCII experimentation. There is nothing preventing the transmission of a second 300 baud signal on the 1270 Hz tone pair at the same time. The problem is getting the two input data channels into the repeater at the same time. This is easily accomplished by adding a second receiver on a different frequency. Now you have a single transmitter alligator which is able to repeat two totally independent data channels as shown in figure 1.

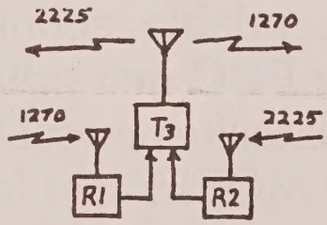


Figure 1. A typical Repeater being used to transmit two independent data channels by the addition of a second receiver and summing the audio.

Next, make an arbitrary definition that data going north should be at 1270 Hz and data going south should be at 2225 Hz and you have built a complete link station that can be used as an element in a multi-station backbone data network. Taking advantage of existing repeaters and frequencies, a possible Atlantic seaboard link system including the AMRAD repeater would appear as shown in figure 2. Only two 450 Mhz frequencies would be required and because of the cross-band techniques used, there is no need for any additional cavities at any of the link stations.

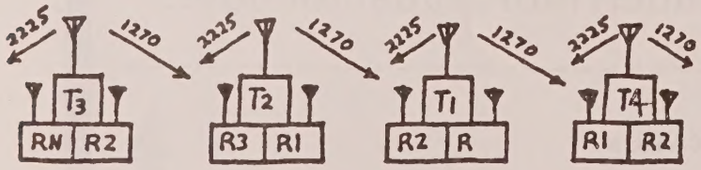


Figure 2. A link system using alternating two meter and 70 cm transmitters. T3 could be AMRAD and T1 could be BRATS. T2 and T4 would be two alternating 70 cm frequencies.

Notice that the original repeater input frequency is not used in the linking process. Voice and other non-data traffic is repeated in the normal manner and has no effect on the link system. However, any station may open the link northward by transmitting using the 1270 Hz tone pair on the repeater input channel or southward by transmitting 2225 Hz tones. The more detailed sketch of figure 3 shows the back-to-back connection of the Originate and Answer modems and use of the carrier detect circuitry to control the link. Notice the advantage of regeneration of the tones and the availability of the data signal at baseband at each link site for possible addition of more intelligent controls as the link system evolves. Also the original repeater carrier operated relay (COR) control system always retains control over the local repeater. The 70 cm link station is similar but has no repeater receiver and no real need for the modem back-to-back regeneration. The COR's on either of the link receivers are used to key the 70 cm transmitter and only simple bandpass filters are used to properly steer the 1270 and 2225 Hz tones.

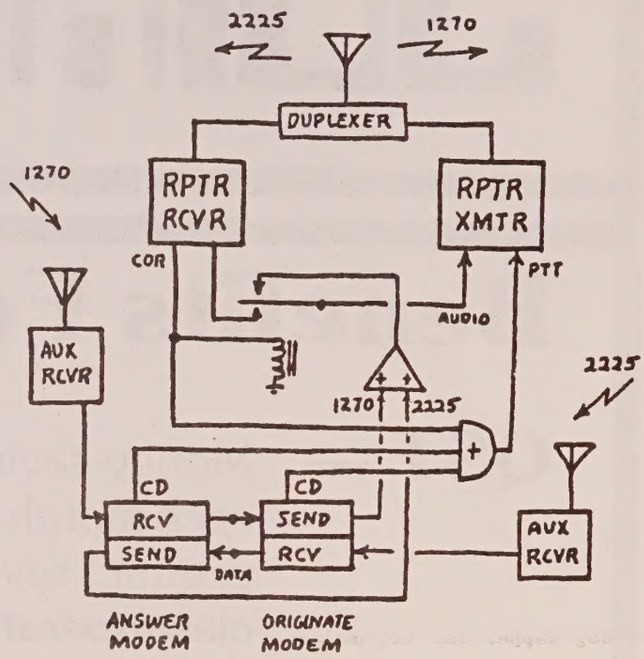


Figure 3. Simplified schematic of back-to-back Originate and Answer modems and use of data carrier detect and repeater COR circuits to control the activation of the link.

For two data repeaters which are close enough to operate directly site-to-site, such as AMRAD and BRATS, an even simpler system is shown in figure 4. Here the independent full duplex capability of the original scheme is traded off for half duplex for simplicity.

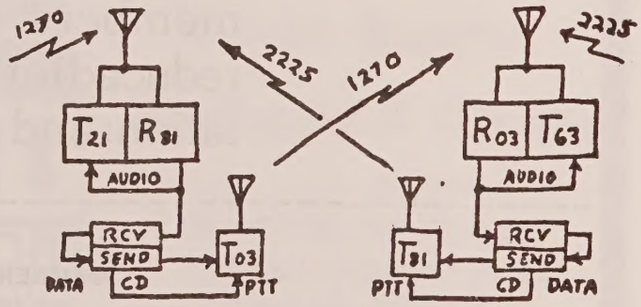


Figure 4. For repeaters within range of each other, a single modem and extra two meter transmitter are all that are necessary to implement the two directional data link at each site.

I feel like a traitor to the Packeteers for proposing such a simple scheme, but it could be a key step in providing the rudamentary traffic channel for coordinating future experiments with the packet repeaters. There has to be a "critical mass" of activity before anything really gets going in amateur radio and this scheme allows anyone with a 300 baud modem to participate. Hopefully this proposal will draw out other repeater groups interested in linking on any level with AMRAD.

**Ulysses S. Ascii Rebuttal**

Merridith Dorthiquer, PhD
Dept. of Theatrical Physics
University of the Air

Scholarship is demanding and exacting. For these reasons, I must pen this rejoiner and rebuttal to the egregious handling of the life and career of Ulysses S. Ascii, one of America's most significantly neglected pioneers in radio, electronics, psychology and revisionist Hawaiian culture. Mrs. Dee, who is the author of the first treatise, did the academic world a coarse injustice, most of all, by failing to mention Ascii's multi-volume encylopedia of Hawaiian ethics and morals in Northern New Jersey. The 46 volumes remain interred at the Finichel Free Library in Fort Lee, NJ to this day, awaiting a publisher. Someone with more intestinal fortitude that the previous author would have done far better to use this and the other basic source on Dr. Ascii's career appearing in Sternwallows's Anals IV.

In the meantime, I must set out with expedition to correct the factual errors already in proliferation in the technical press. First of all, the original family name was not Askew, but Askance. The senior member of the family was an immigrant from Alsae-Lorraine, not Walse. He married a young mail clerk in Teaneck, NJ in 1883 named Flushia Elmac whose family can be traced back to the original Elmac of the New Jersey Pine Barrens.

The father of young Ulysses passed away three years later while testing the baby formula - a clever mixture of calomel and Yoo-Hoo Chocolate Drink. The influence on young Ascii was less the mystic and time-wasting projects of the infamous Dr. Lollomalopallado than the precise inventive mind of Prof. Felix Fornizor, late of Bayonne, NJ. Dr. Fornizor is known for his invention of the steam-turbine railway engine and the electronic bug zapper for indoor use.

Ulysses fell under the instructive charm of Dr. Fornizor and under his guidance developed an early interest in the possible use of liquids as an antenna. Patented under the title "A Hydromatic Media Which Emits Electromagnetic Energy," he attempted to sell the process under Duplex Laboratories of New Haven, CT.

In 1912 Ascii postulated a method of transmitting high-fidelity music over the then-primitive medium of radio. Recognizing the immense significance of the idea, Dr. Fornizor put Ascii in touch Henry Strongarm of Columnar University. However, Strongarm counseled Ascii as to the infeasibility of his invention. Circumstances turned bitter for Ascii years later when he discovered that Dr. Strongarm patented his high-fidelity method as his own original work. Stung by the betrayal of his confidence and saddened by the advancing senility of Dr. Fornizor, Ascii was driven to the sorcery and pseudoscience of Lollomalopallado. When the Secret Pellow Society was disbanded, a gross personal mishap to all of its members, Ascii served his first tenured position at Rahway State Penitentiary, the "Penn State" of his memoirs. His first interest there was Hawaiin cookery. While an inmate he concocted a fascinating chip dip for summer festivals. Later, while a transient resident of Baltimore, a fellow gambler won the formula in a rigged poker game and sold the patent to the Times Beach Paint Company.

Ascii was determined to test his idea of liquids as an antenna and had constructed an unlicensed broadcast station in Bergen County, NJ. When the antenna exploded, a minor forest fire scorched a perfectly trapizoidal swath all the way to Wildwood. The police authorities could not explain the freak fire which touched off a panic of UFO scares.

Ascii spent many nights with a confidence operator, Joe, "The Hand," trying to pick the shell which had the pea concealed beneath it. After losing most of his money in failed attempts, Ascii was moved to set down what would become an early rendering of information theory. His notes on this brilliant speculation are, in the main, lost. Some wet and badly soiled scraps were removed from the clogged plumbing of a wing of Rahway Penitentiary in 1967. This memorable document is now interred in the collection of the Lollomalopalado estate. This historical fact calls to mind the actual state of the supposed last papers of the Pellow Brotherhood. They were, indeed, retrieved from the Hudson River by some skin divers hired by the Perth Amboy New School of Meat Science. A team of Arabic scholars have examined them as late as 1972. The supervisor of the study group, Shiekh Sitin al Qatin, declared "It is quite possibly jibberish!" Finally, the Rahway convict who choked on a prune pit and died was not, in fact, Ulysses S. Ascii. The body was identified by prison cafeterial employees as Bernard Freen, a moron who resembled Ascii and often thought that he was Ascii. The eminent Ulysses S. Ascii died in his sleep at the Perigord Home outside Erie, PA on February 4, 1972. For further reference consult Morton Shotbag's Almanac VII. Respectfully submitted Merridith Dorthiquer, PhD, Dept. of Theatrical Physics, University of the Air.

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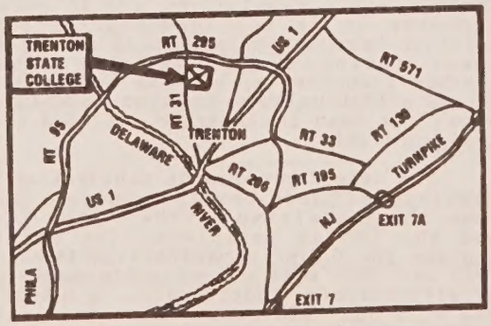


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**Banquet**
**$10.00** Saturday Night

# Tucson Amateur Packet Radio Activities

Lyle Johnson, WA7GXD
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February was a very busy month for TAPR. As reported last month, the annual meeting was held on February 5th, with a large turnout. Presentations were made on TAPR, the TAPR TNC, general packet activities and AMSAT's packet related efforts on both Phase 3-B and the new PACSAT concept. TNCs were distributed after the meeting to those out-of-towners present.

Since then, additional TNCs have been sent to Beta sites in San Francisco, Washington, Little Rock, Dayton, Colorado Springs, southern California and many other locations. As of this writing, over 120 of the 160 Beta TNCs ordered have shipped. The remainder are being tested, repaired and calibrated. The sites still waiting have had the TNC manuals, transformers and cabling sent, so they can get their packet stations ready.

Some stations have been on the air with their TAPR TNCs for over a month, and reports are beginning to come in through the Beta test network. Some bugs, both hardware and software, have been reported, and many have had fixes worked out already. Two groups are fabricating cabinets. One is a simple aluminum case with cutting and painting left to the owner at a cost of only $10, while the other is an anodized and silk-screened custom cabinet, prepunched and going at about $40. Both are expected to be seen at the 2nd ARRL Computer Networking Conference in San Francisco in mid-March.

What are some of the problems? In the software area, some "monster packets" occurred, which have since been corrected. An inconsistency has been noted with regard to the PID flag in the AX.25 protocol, which has also been fixed. (This one was due to working from an incomplete specification of AX.25). Other minor problems have been detected, and it is certain that there will be more.

In the hardware realm, some difficulties have cropped up. The major symptom is "deafness," where the TNC refuses to recognize a good packet, or even a bad one for that matter. The problem has been traced to the power supply section (remember when the early manned space flights were scrubbed due to a simple valve?) where two primary design weaknesses have shown up.

The first one is due to a mis-specification of the custom power transformer. The + 12-volt supply winding produces insufficient voltage, causing ripple when the ac supply voltage drops below about 121 Vac. The XR-2211 PLL demodulator lacks on-chip regulation, and it goes on strike whenever it is fed less-than-perfect dc. The solution here is threefold: a) move closer to the power station; b) use a variable transformer (or another transformer, such as a Stancor PC3A); or, c) use a 7810 voltage regulator. While choice (a) hasn't yet been implemented, (b) and (c) have with good success!

The second problem is oscillation of the 79xx regulators. These beasts require more bypassing than their positive brethern (the 78xx series), and the TNC is deficient. The solution is to replace the 0.1-uF capacitors at the output of the 7912 and 7905 with a 1-uF solid tantalum or a 10-uF electrolytic. Additionally, a 0.1-uF cap across the +12V and -12V supply pins (to ground) at the 1488 RS-232C driver helps calm down this eager chip. Since these oscillations are somewhat random, occuring before and after checking, but not often during, it is recommended that all Beta TNCs have these mods done.

What about interfacing? The Beta TNC has been interfaced to many, many 2-meter fm rigs, with the Kenwood TR-7400s being the only ones consistently troublesome, and that on the receive side. ICOM rigs generally need the assistance of either a relay or a VFET to pull the transmit key line down to a low enough potential to ensure reliable transmitter activation. Yaesus, Azdens, and maybe even a few American rigs (such as Heaths) have been, and are being, used with no problems. Many hand-helds have been used, and operation through a number of voice-grade repeaters has been accomplished so routinely as to be boring.

In the arena of the computer/terminal, Apples, TRS-80 and TRS-80 Color machines, VIC-20's, S-100 boxes, "portable" devices...even the 68000-based Sage, all have been used with no problems. Yes, even the lowly IBM PC has been known to work with the TNC without problems!

The interfacing data is being compiled by TAPR to be shared amongst the various Beta sites, and after verification to be included in appendices to the TNC Manual.

TNC Manual? You bet! This is an over 140-page document that is packed with all sorts of detailed information on the TNC, packet radio operations, interfacing, hardware descriptions, schematics (complete with errors...), and descriptions of both the "Vancouver Protocol" and the AX.25 spec. This item is being made available to those interested for the nominal price of $15. (If you read the TAPR Activities column in the February 1983 issue of the AMRAD Newsletter, you will understand why we are gouging people for this book. Actually, it isn't all that high).

What lies ahead? Priority One is getting the rest of the Beta boards out the door. Then, once Beta test has demonstrated the successful operation of the TNCs, including bug fixes, a mechanism will be employed to get the TNCs in the hands of anyone who wants one (but not for free). Since TAPR is a non-profit R&D group, not a mass merchandising outfit, suitable means are presently being explored. The expected form is that of bare boards, manuals, and parts kit(s). Details will be found first in the Packet Status Register, the Tucson Amateur Packet Radio newsletter, as well as in this column in the AMRAD Newsletter.

Next is the EPROM programmer. This is an off-board accessory for the TNC that allows one to burn 2764 type EPROMs using the TNC's parallel port. It is currently being tested and should be ready for distribution to Beta sites about the time this appears in print. The software drivers will be included in the next release of software, which the programmer will accompany, allowing sites to bootstrap the new software onto other TNCs. This saves the TAPR programmers the hassle of generating distribution copies to everyone -- only about two dozen copies need be made. At under $40, it's also a cheap way to get an EPROM programmer!

Then our attention will focus on networking. We intend to participate in the hf experiments, particularly using AMRAD's adaptive MSK modem. Further, many TAPRites are active in the PACSAT project, as well as gearing up for AMICON on Phase 3-B. However, TAPR would like to sharpen its focus and exercise its efforts toward a high-speed uhf/microwave intercity linking system. Ambitious? Yes! Can we do it? With your help, yes!

TAPR will be at the Dayton Hamfest. See you there!

# PROTOCOL

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Sterling, VA 22170
703-450-5284

As Terry, WB4JFI and Paul, W4RI get ready to take off for San Francisco for the big packet conference, many frames are flying on the old voice repeater. As usual and to be expected, voice users receive an occasional surprise when what they observe as noise and junk on the old machine shows some intelligence and turns out not to be some new kind of beep on the end of a kerchunker. All that should cease fairly quickly as our new repeater goes "on the mountain".

Beta testing of the TAPR boards, mentioned last month, continues. A report is included in Lyle, WA7GXD's column elsewhere in this newsletter. I have placed myself in charge of changing the new LIPM05/TIPM05 AX.25 software to connect properly to TAPR boards. Tom Clark, W3IWI has been most helpful in this regard and some new software should be forthcoming. Currently, Vancouver sends TAPR SABM, TAPR responds UA correctly, Vancouver sends two RR (unusual, but allowed) and Vancouver responds with an information frame over and over again until the Vancouver owner gets tired and hits reset.

Another bug discovered in the Vancouver software is that a connection to self thru the repeater is no longer allowed. Jon, KE3Z has identified the software area causing this and a fix will be introduced and tested. We are holding the fix until we can identify a fix to the TAPR-Vancouver connection also.

Jon, KE3Z, has built a packet monitor capability using an STD-Bus computer. This is a most interesting hardware setup, and Jon will be convinced to write about it soon. Basically, he uses a Zilog SIO and gets his receive clock from a state machine circuit. It is working well, and Jon is off working on the transmit side. The transmit circuit fixes a problem of Paul's (W4RI) in that an easy preframe sync lashup adds preframe sync to packets, something TAPR and 8530 TNCs do not do currently. In addition, Jon is adding hardware CWID, a welcome addition.

I received a call from Australia. John Tinner, VK2ZXQ is on packet using Vancouver TNC boards. He has four others working with him near Sydney, Australia. They have a repeater (required because of the terrain) and are anxious to try AX.25. I hesitate to mail him Hank, KA6M's latest code as it is not debugged yet, but they are champing at the bit to SABM connect. We should be hearing more from this crowd, especially as soon as AMSAT Phase IIIB flys. I look forward to connecting with John.

AMRAD, SLAPR, and TAPR plan to share a table at the Dayton Hamvention. So if you attend, prepare to hear lots of packets flying on 220 MHz. I hope by then that we will connect to them without "forever packets" resulting.

Once again we see the computer hog. That is connecting a computer to a packet board and running it remotely. That works great, but when large dumps are coming out of the computer, a hunt-and-peck typer works hard to get a packet in edgewise. We need more packet repeaters. We should devote a whole machine to computer packet communications.

Terry, WB4JFI, has got the AX.25 repeater running top notch on the AMRAD repeater. While Paul and he are at the San Francisco conference, Sandy, WB5MMB and I plan to test out the thing in the final mountain-top configuration to make sure it is ready to move to Eric's mountain. Listen on 147.585 MHz for these test and connect up thru it to help check it out. Sandy has solved all the RFI troubles with toroids and shielding and has improved the radio interface board (Paul's RIB). These machines are much simpler than voice repeaters.

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## AMRAD Amateur Radio Research and Development Corporation

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*I agree to support the purposes of the Corporation.*

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**The Amateur Radio Research and Development Corporation (AMRAD)** is a worldwide club of over 500 amateur radio and computer experimenters. It is incorporated in Virginia and is recognized by the U.S. Internal Revenue Service as a tax-exempt scientific and educational organization.

**The purposes of AMRAD** are to: develop skills and knowledge in radio and electronic technology; advocate design of experimental equipment and techniques; promote basic and applied research; organize technical forums and symposiums; collect and disseminate technical information; and, provide experimental repeaters.

**Meetings are on the 1st Monday** of each month at 7:30 P.M. at the Patrick Henry Branch Library, 101 Maple Ave E, Vienna, VA. If the first month is a holiday, an alternate date will be announced in the newsletter. Except for the annual meeting in December, meetings are normally reserved for technical talks - not business.

**WD4IWG/R** is an open repeater for fm voice and digital communications, especially for experimental modes. It is located at Tyson's Corner, McLean, VA. It features semi-private autopatch available to licensed members. Frequencies are: 147.81 MHz in, 147.21 MHz out. The repeater director is Jeff Brennan, WB4WLW.

**WB4JFI/R** is a 1200-baud half-duplex packet repeater in Falls Church, VA and may be accessed via WD4IWG/R frequencies.

**WB5MMB/R** is a 1200-baud simplex packet repeater on 147.585 MHz from Vienna, VA, soon to become K3NA/R from Frederick, MD.

**The AMRAD CBBS, 703-734-1387,** is operated by Terry Fox, WB4JFI. The system accepts 110, 300, 450 and 600-baud ASCII, Bell 103.

**Handicapped Education Exchange, 301-593-7033,** is operated by Dick Barth, W3HWN. HEX accepts 110/300-baud ASCII and Baudot deaf TTY/TDD calls.

**AMRAD is affiliated** with the American Radio Relay League (ARRL), Foundation for Amateur Radio (FAR), Northern Virginia Radio Council (NOVARC) and the Mid Atlantic Repeater Council (T-MARC).

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